Lecture

Module 15: Designing Alternative Futures for Managed Landscapes

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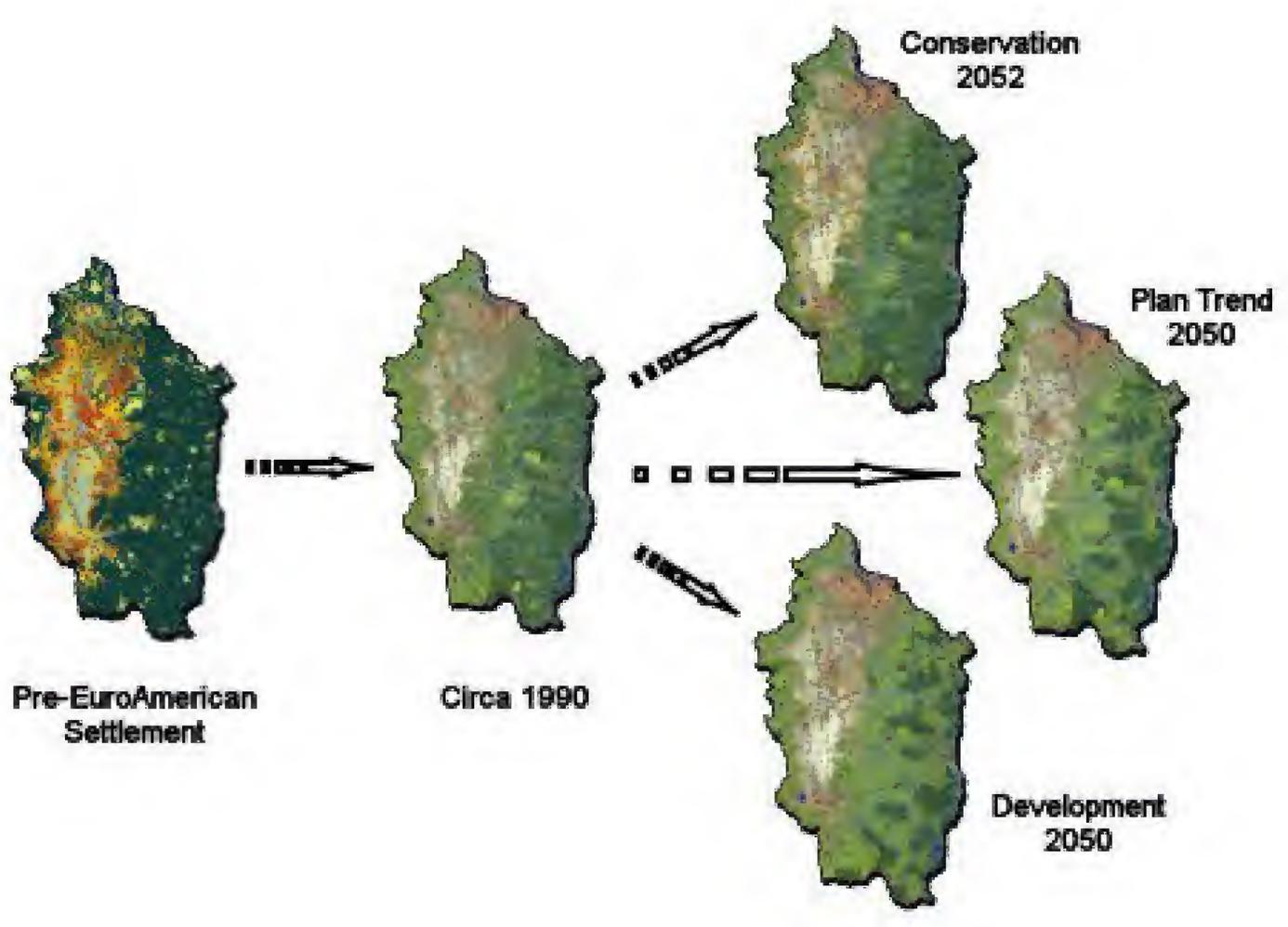
Learning Objectives

Upon completion of this module, participants will be able to:

1. Describe how Alternative Futures Projects can be used in conjunction with the NRCS 9-Step Planning process to facilitate land management decisions at multiple scales.

2. Understand how to integrate spatially explicit social, economic, and land use data into historical, current and projected ecological conditions to evaluate alternatives for land management.

3. Understand the compelling nature of visually presenting land management scenarios to decision-makers so that they can better understand the long-term ecological and economic consequences of their actions on the landscape and local communities.



Lecture Outline

Alternative Futures projects: envisioning change in local environments
- Multiple spatially-explicit alternatives for future land/water use
- Comparing and contrasting alternatives to evaluate their effects on things people care about.
- Determining what people care about

Components of alternative future projects
- Preparation of future scenarios
- Preparation of evaluation models
- Evaluation of alternatives
- Dissemination of results

Examples of where alternative futures analysis projects have been done
1. Modeling Effects of Alternative Landscape Design and Management on Water Quality and Biodiversity in Midwest Agricultural Watersheds
2. Willamette River basin, OR

Key considerations in conducting an alternative futures project: the Willamette project example

Using alternative futures planning to restore ecological processes on individual parcels of private lands

Exercises

Classroom Exercise.

1. Although *Alternative Futures Analysis* is a relatively new approach for assessing ecological, economic and/or cultural conditions in landscapes, there have been a number of these projects completed across the country. Several of these projects are well documented as case studies available on the internet. Your task is to complete a cursory review of these sites, choose one of the studies to evaluate, and apply the processes that were used and the findings to your area.

A. Northeast Region: Alternative Futures for Monroe County, Pennsylvania. Http://www.gsd.harvard.edu/depts/larchdep/research/monroe/

This study is the product of student work in a graduate-level studio at the Harvard University Graduate School of Design. The project was sponsored by the U.S. EPA Region III, the Monroe County Commissioners, the Monroe County Conservation District, the Monroe County Planning Commission, and USDA Forest Service. The web site provides a summary of the group's findings and presents issues, planning strategies, and design proposals based on the conditions and options Monroe County faces today.

B. Midwest Region: Modeling Effects of Alternative Landscape Design and Management on Water Quality and Biodiversity in Midwest Agricultural Watersheds.
http://www.snre.umich.edu/nassauer/lab_index.html

This agriculturally-focused project was intended to help inform landowners and policy makers of effects of land use and management choices, particularly as they affect water quality, biodiversity, landowner aesthetic preferences, and economic return from commodity production. Two small watersheds in central Iowa were studied over a 3-year period. Results compare and contrast the effects and findings. Today, this study is being used to determine agricultural policy at the local, state and federal levels.

C. West Region, Landscape Scale: Alternative Futures for the region of Camp Pendleton, California. http://www.gsd.harvard.edu/brc/report/000_front.html

This very sophisticated (and costly!) project explores how urban growth and change in the rapidly developing area located between San Diego and Los Angeles is likely to influence the biodiversity in the area. The research was supported by the Strategic Environmental Research and Development Program (SERDP), a joint program of the U.S. Department of Defense, the Department of Energy, the EPA through a grant to the Western Ecology Division of EPA's National Health and Environmental Effects Research Laboratory, and the USDA Forest Service Pacific Northwest Research Station, Corvallis. The study region encompasses the five major river drainage basins directly influencing Camp Pendleton in southern California. The study is based on the hypothesis that the major stressors causing biodiversity change in the landscape are related to urbanization. As population increases and development spreads, habitat is lost due to associated land management actions and land uses. There are also indirect, secondary and cumulative effects on vegetation by development through hydrologic and fire influences.

The following website provides information on what actions are being taken currently to implement the findings:
http://www.gsd.harvard.edu/research/projects/la/pendleton/

D. West Region, Watershed Scale: Possible Futures for Muddy Creek, Oregon.
http://ise.uoregon.edu. Click on "previous projects" then click on "Muddy Creek."

Using GIS and related tools, researchers produced digital and paper representations depicting the past, present and potential future conditions of a 320 square km watershed in western Oregon. Land uses in the watershed are primarily forestry, agriculture, and rural residential development. The past, present and alternative future depictions were used to identify trends over space and time in human occupancy and natural resources. Based on a set of values and desired future conditions developed with local citizens and stakeholders, digital representations of the alternative future landscapes were evaluated for their effects on water quality and biodiversity, using hydrological and ecological effects models. The water quality evaluative model, a non-point pollutant source geographic information system model, simulated storm events based on field

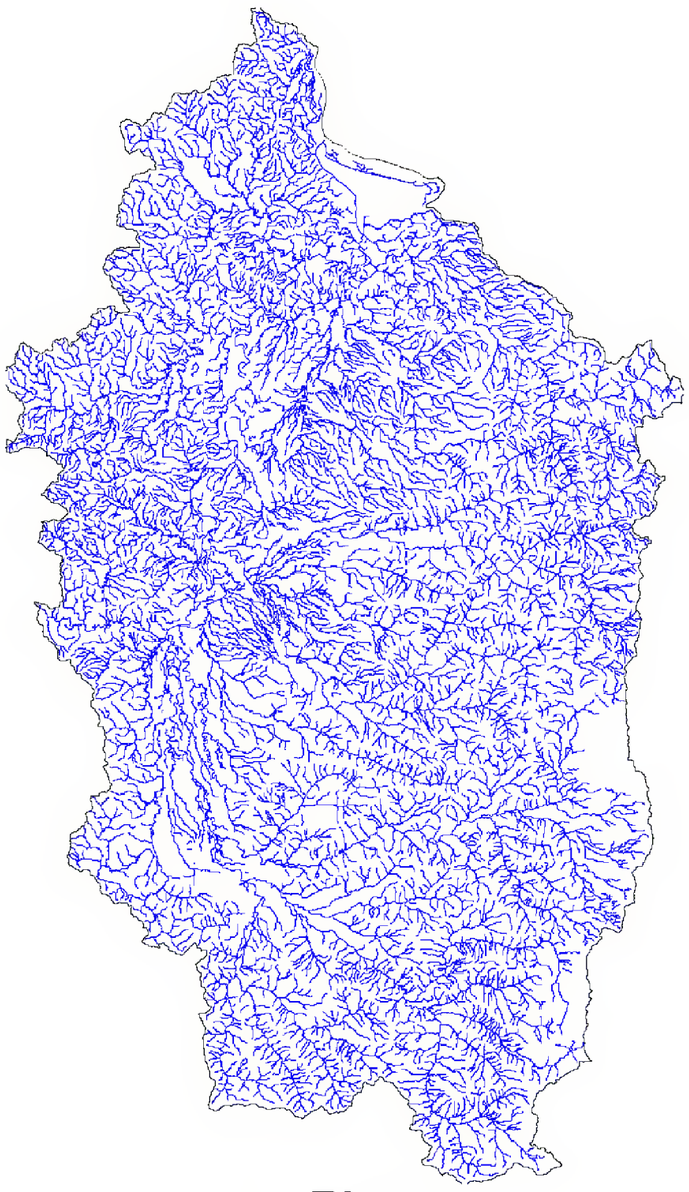
data to calculate pollutant loads across the five alternative futures, the present and the past. The biodiversity evaluative model measured the change in species richness and potential habitat area for breeding species, in each alternative future and the past, compared to the present.

2. The following maps of the Willamette River Basin were developed for land cover (vegetation), land ownership, roads, population, and streams. Are these types of spatial information available in your area for development of current landscape conditions and alternatives scenarios for the future? Are there alternative data layers or substitutes for these types of information?

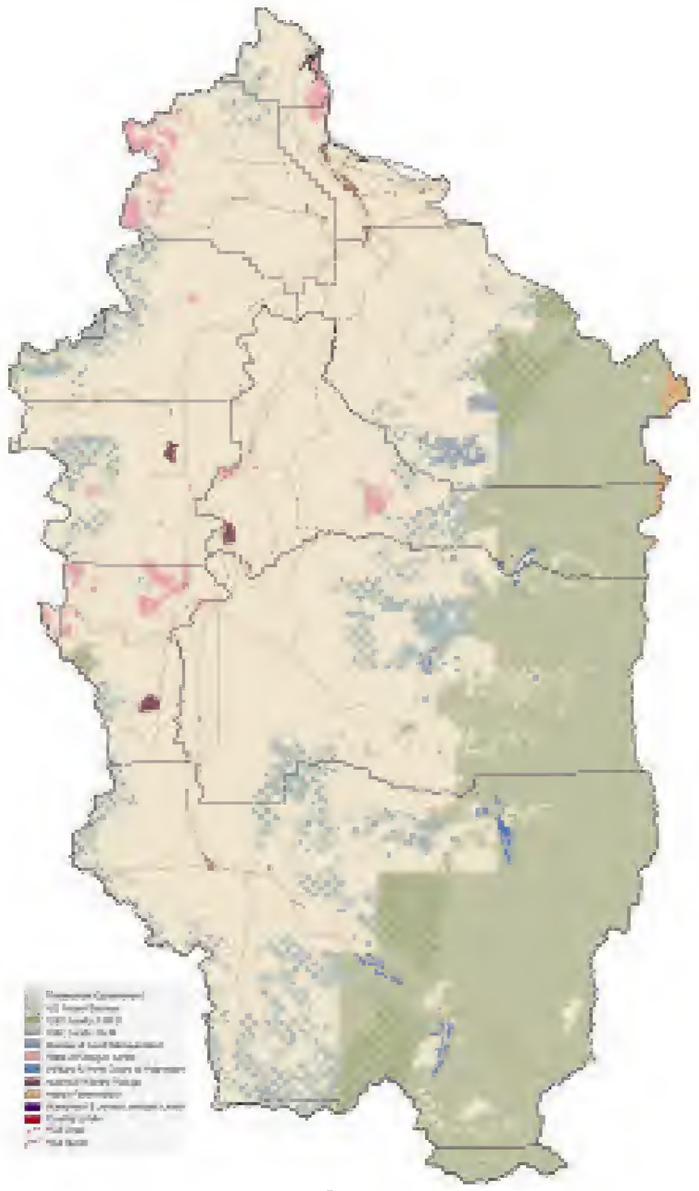
	Available?	Substitutes
Land cover -		
Land ownership -		
Roads -		
Population -		
Streams -		
Ecoregions -		
Other -		

What is the relative quality of the different types of information? (10 = excellent quantitative information; 1 = extremely poor, low resolution information, 0 = no information). If you were evaluating an area of 400 mi^2, how far off would estimates be for each layer (as a percent of the total area or length of specific components such as crops or different order streams)?

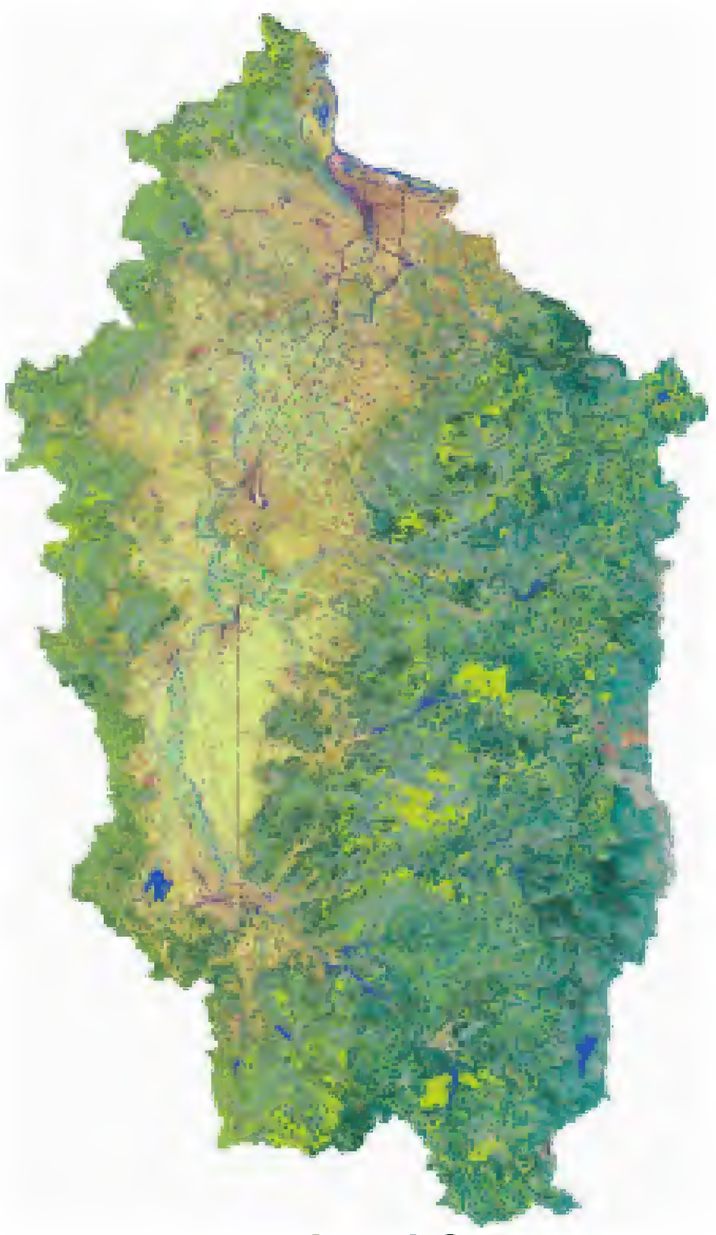
		How Far Off?		
	Quality (0-10)	Pretty Close (+/-10%)	So So (+/-10-20%)	Way Off (+/->20%)
Land cover				
Land ownership				
Roads				
Population				
Streams				
Ecoregions				



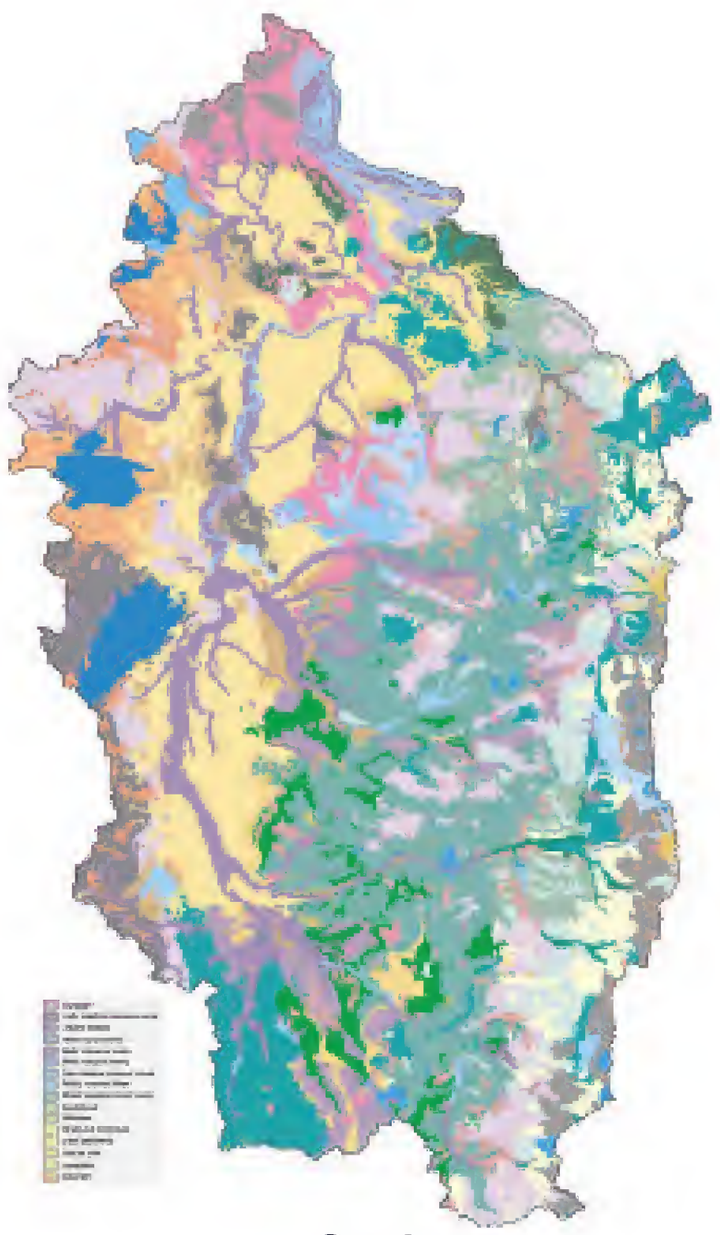
Rivers



Ownership

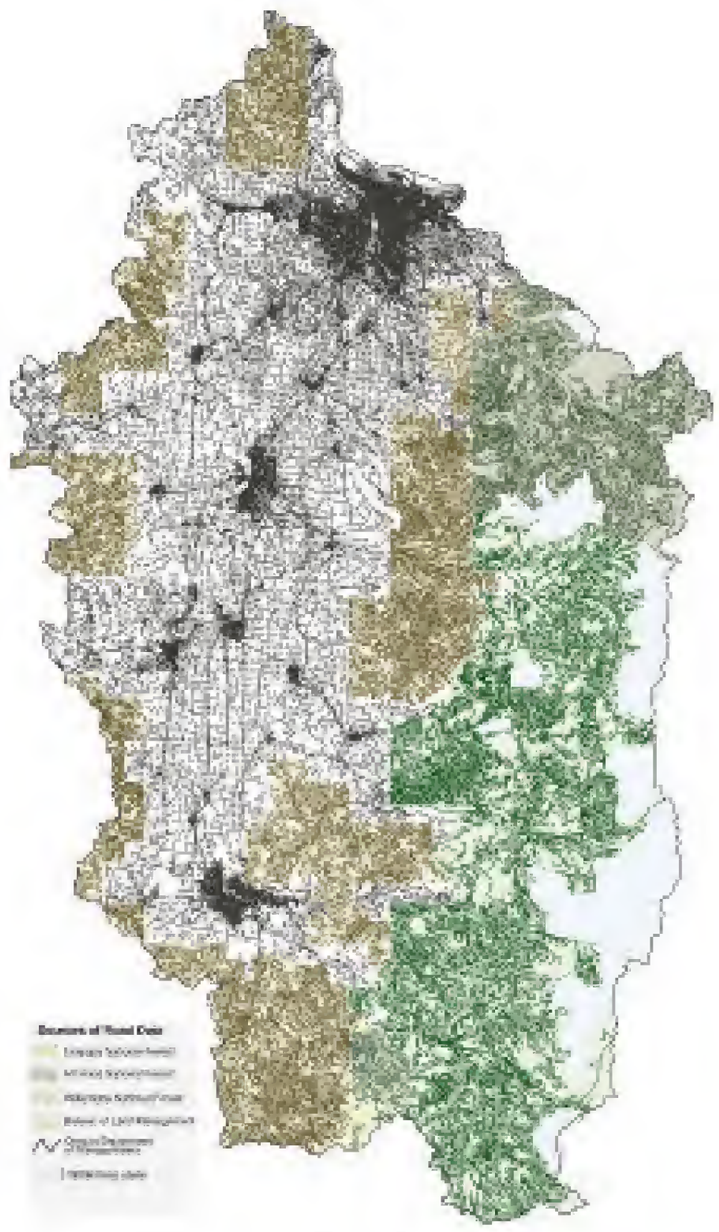


Land Cover

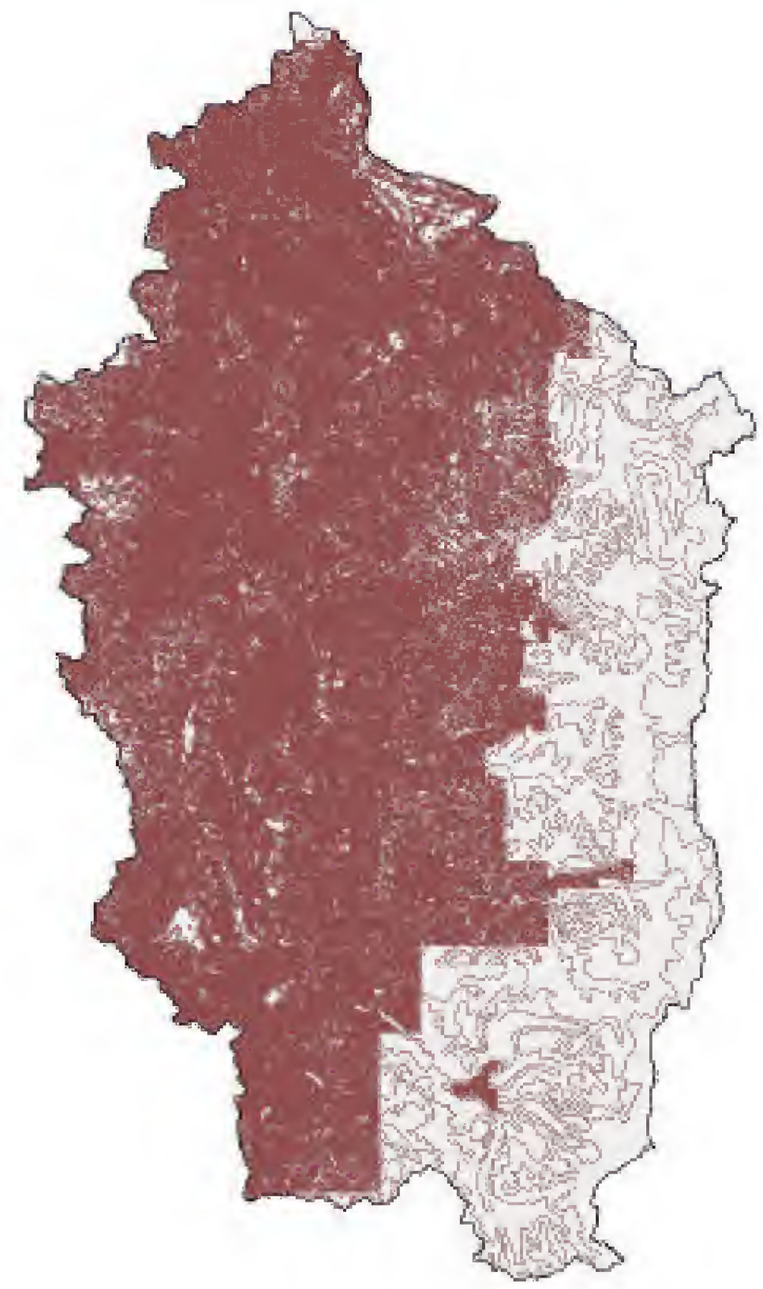


Geology

Ecoregions



Roads



Soils

3. How could you develop the assumptions about future land management practices, land use patterns, population trends, restoration actions, or economic responses?

Teams of land managers
Teams of research scientists
Stakeholder groups
County or state planners
Watershed councils
Computer landscape models
Other: _____
_____
_____

List one advantage and one disadvantage for each.

Teams of land managers
Advantage _____

Disadvantage _____

Teams of research scientists
Advantage _____

Disadvantage _____

Stakeholder groups
Advantage _____

Disadvantage _____

Watershed councils
Advantage _____

Disadvantage _____

Computer landscape models
Advantage _____

Disadvantage _____

Other
Advantage _____

Disadvantage _____

4. How could you illustrate the projected scenarios for future conditions to help the public visualize the different alternatives for future landscapes without access to complex computer models and visualization techniques? Consider using materials or activities available in every community (examples are photographs, drawings, field tours, community activities, etc.).

a.

b.

c.

Discussion Questions.

1. The products of Alternative Futures Analyses are expensive to produce, requiring specialized technology, computer hardware and software, and research scientists. These products include hardcopy atlases, GIS coverages, websites, photo sets, and videos of computer simulated conditions on the ground, all of which display information to help decision-makers. Considering the inestimable intrinsic values humans place on scenery and wildlife, do you think these types of planning efforts are worth the costs? Discuss ways in which funding for an Alternative Futures Analysis in your area could be acquired, leveraged, and most effectively used to help guide land management decisions in your community.

2. Compare the case study you evaluated with a recent land planning effort you have been involved with. What are the advantages of using your approach over an Alternative Futures approach, and vice versa?

Study Questions

1. Discuss the similarities and differences between an Alternative Futures Approach to planning and the NRCS 9-Step Planning Process.

2. How could the elements of "futures" and landscape-level ecological considerations be incorporated into the NRCS approach to planning at the farm scale?

3. If an Alternative Futures Project were conducted in your area, how would you be able to assist the stakeholders and/or researchers in disseminating the information to people who might benefit from this spatially explicit analysis of the landscape within which they manage their land?

4. The Iowa futures project differed from the Oregon futures project in how assumptions and alternatives were defined (scientists vs. local stakeholders). What are the advantages and disadvantages of conducting this type of project with stakeholders defining the assumptions as opposed to the research community?

References and Selected Reading

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Slides used in lecture

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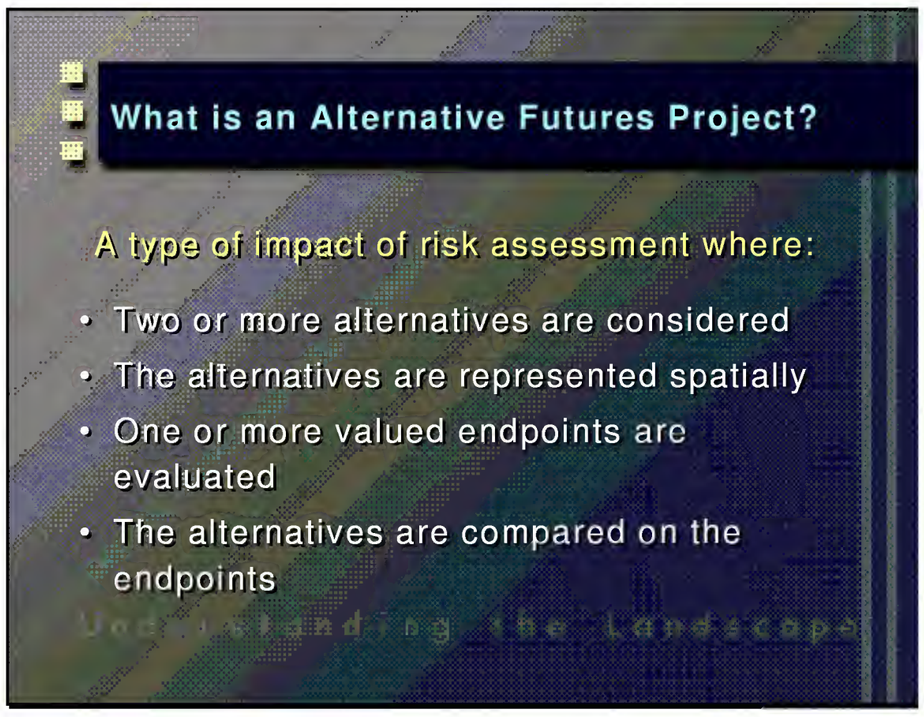

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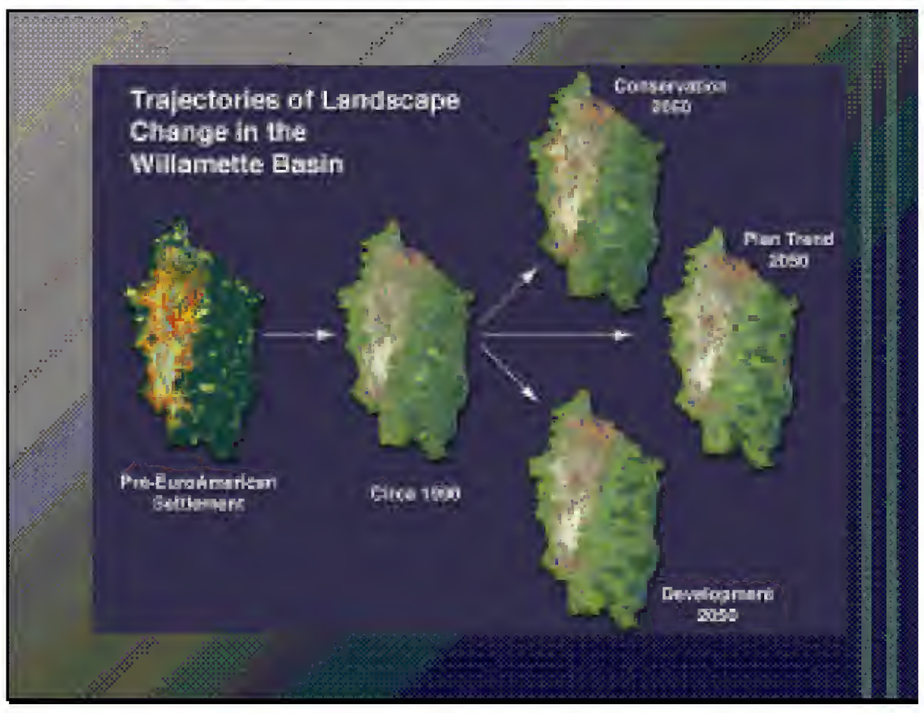

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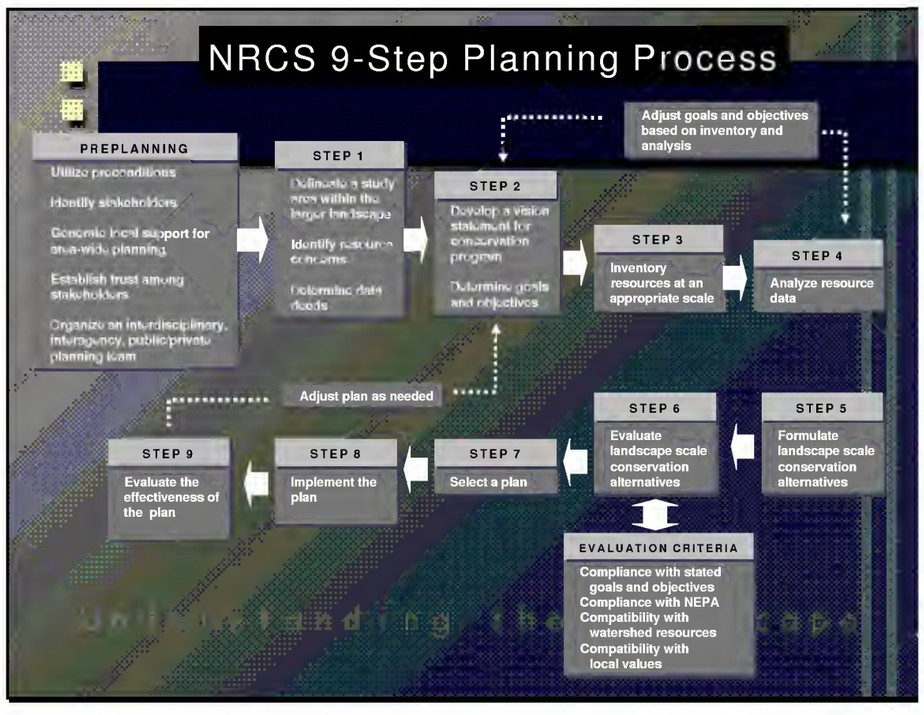

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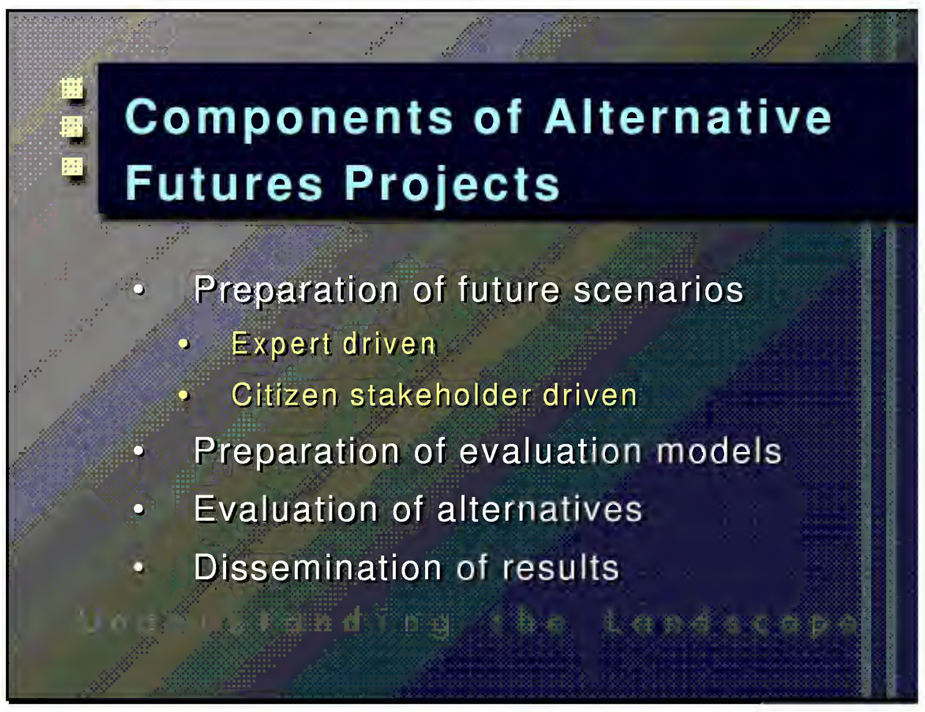

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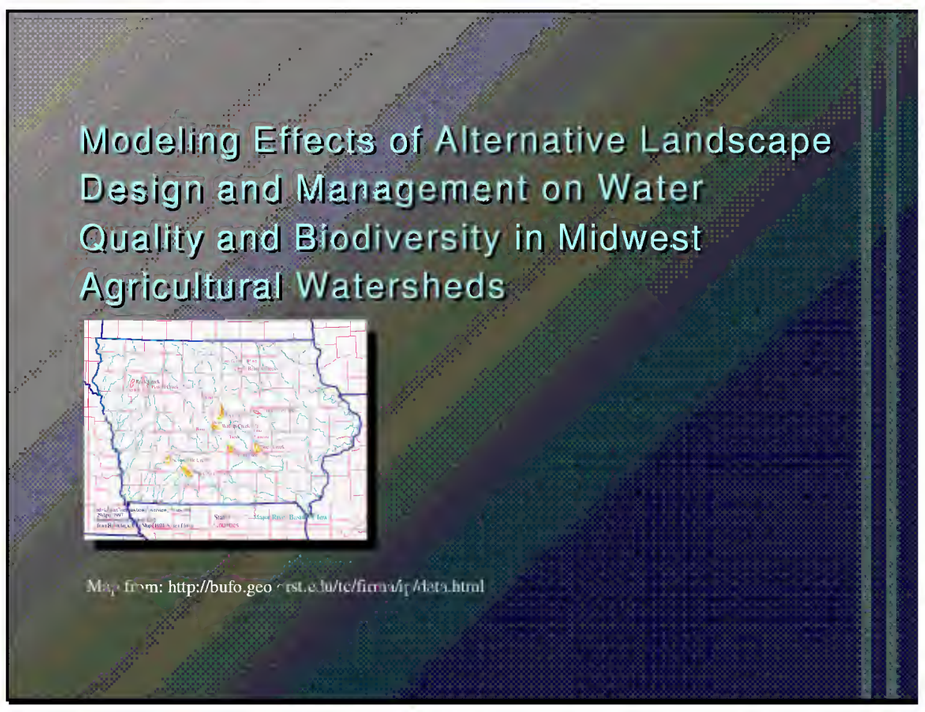

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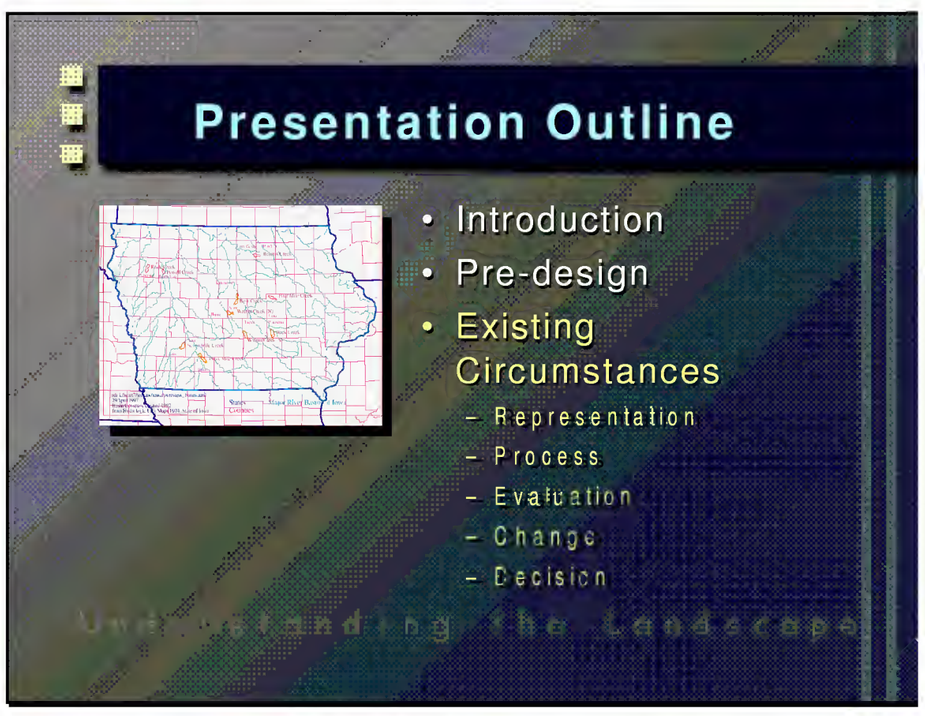

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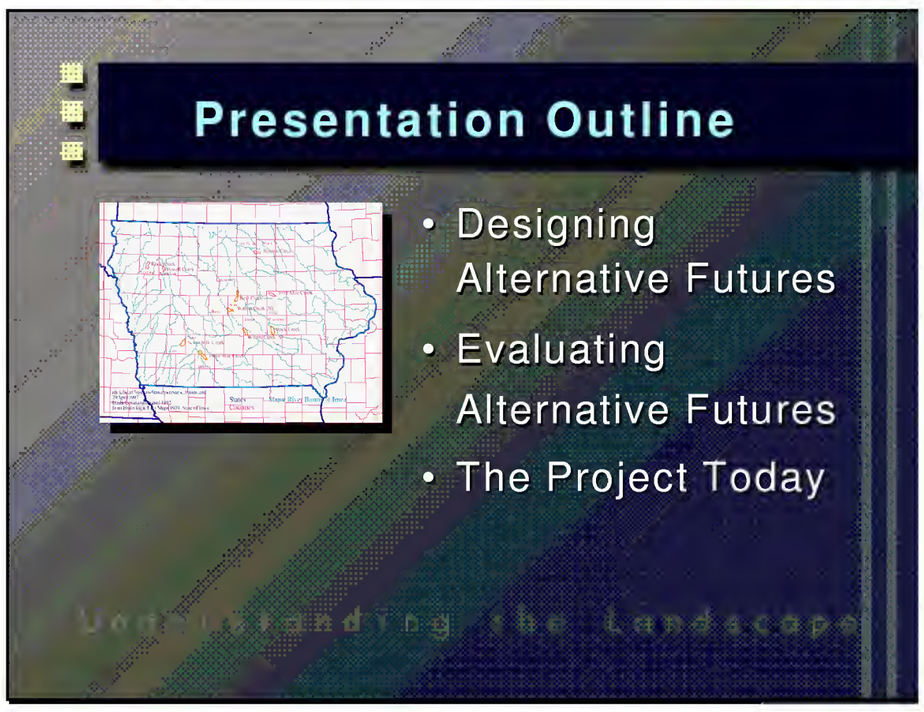

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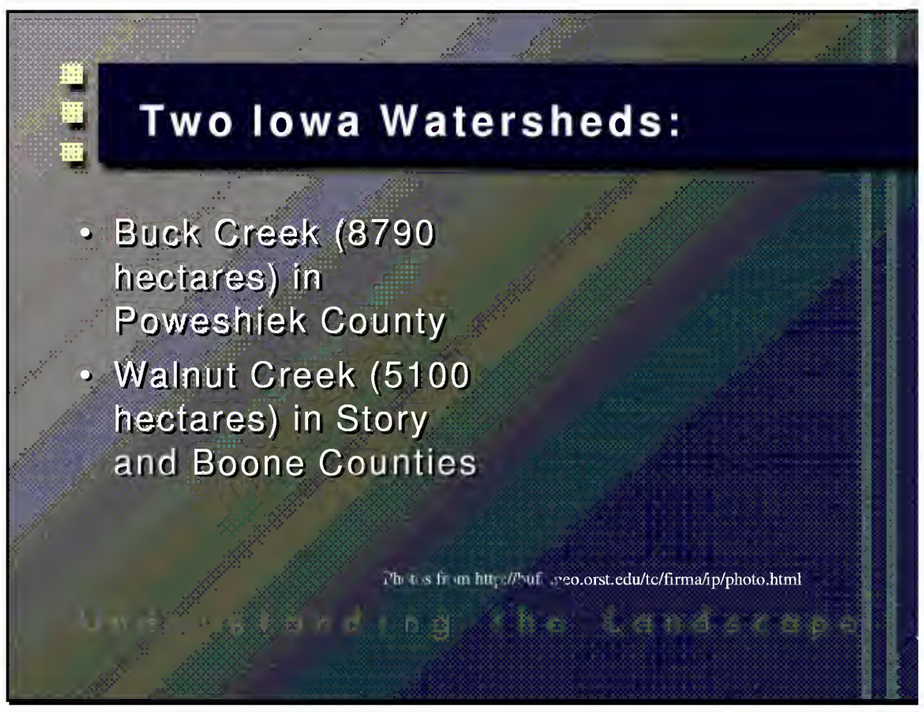

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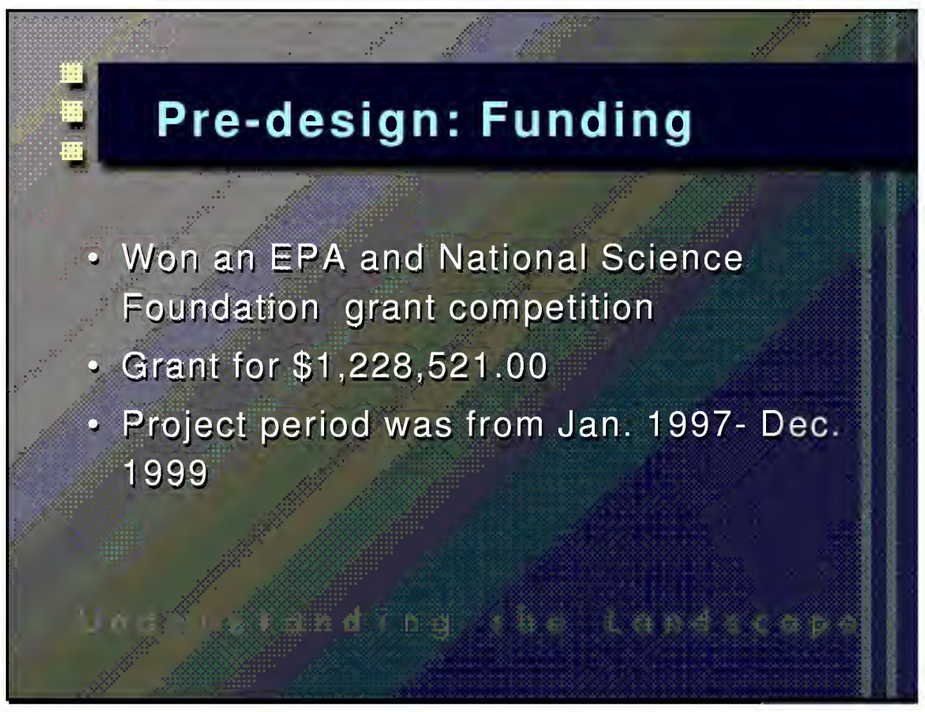

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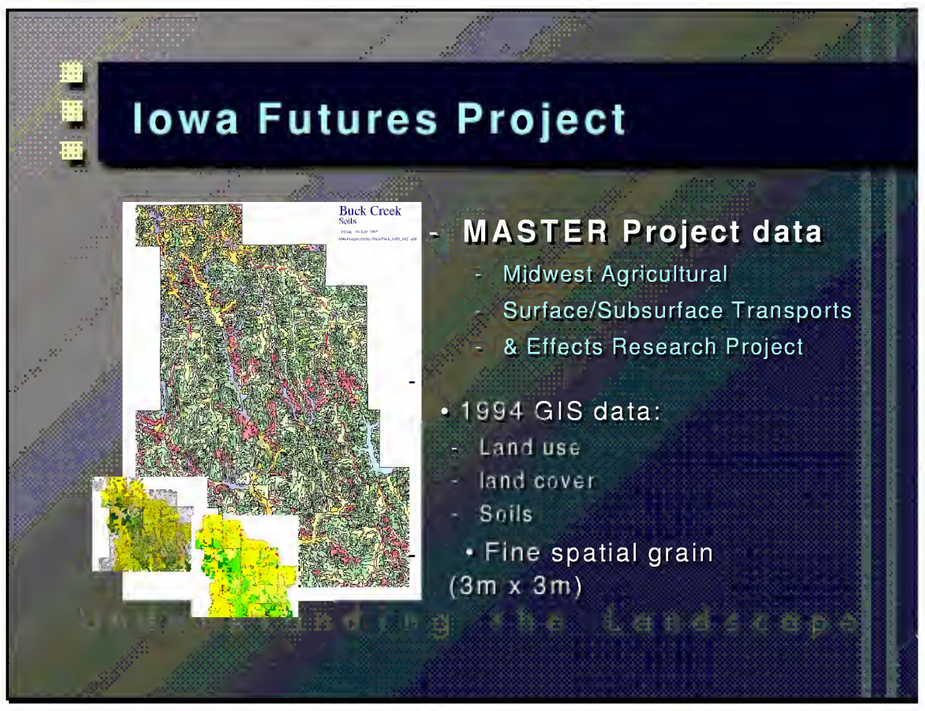

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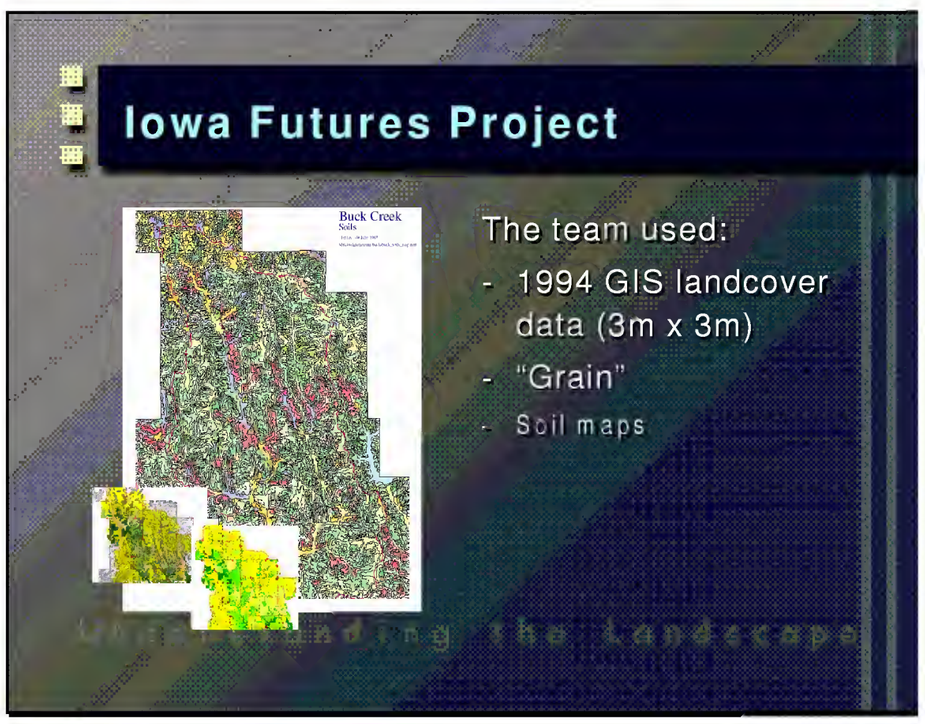

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- Woodland (closed)
- Woodland (open)
- Savannah
- Shrubland
- Corn/Soybeans
- CRP
- Alfalfa
- Pasture
- Farmstead
- Farmstead W/ windbreak
- Farmstead w/ livestock
- Farmstead w/windbreak & livestock
- Pond/Lake
- Residential/Industrial
- Fencerow moderate-dense
- Fencerow sparse
- Fencerow herbaceous
- Fencerow herbaceous w/ fence
- Roadside sparse-dense
- Roadside sparse-dense w/ overhead lines
- Roadside herbaceous
- Roadside herbaceous w/ fenceline
- Roadside herbaceous w/ overhead lines
- Roadside herbaceous w/ fenceline & overhead lines
- Road paved
- Road gravel
- Railroad right-of-way
- Grass waterway
- Terrace
- Riparian dense
- Riparian moderate
- Riparian sparse
- Riparian herbaceous
- Cemetery/churchyard
- Field border
- Contoured buffer strip
- Miscellaneous grass

Slide 14

Existing Circumstances - Process

Relevant natural and cultural processes:

- Crop type and location
- Farming practices
- Agricultural policy
- Economics
- Perception
- Population

Understanding the Landscape

Slide 15

Existing Circumstances - Evaluation

Evaluative yardsticks:

- Water quality
- Biodiversity
- Landscape perception
- Economics

Understanding the Landscape

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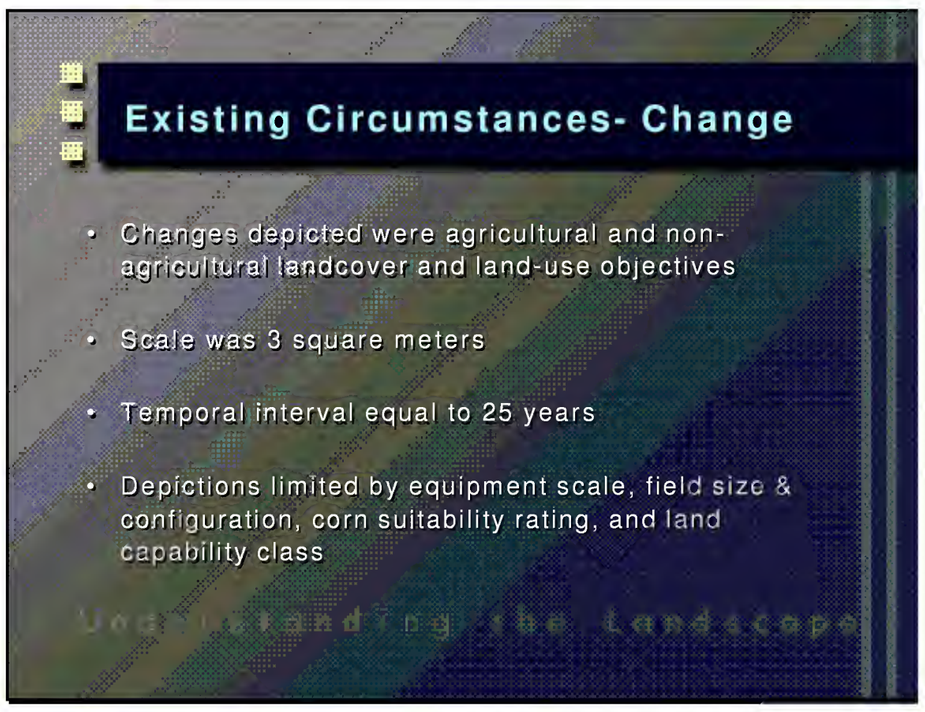

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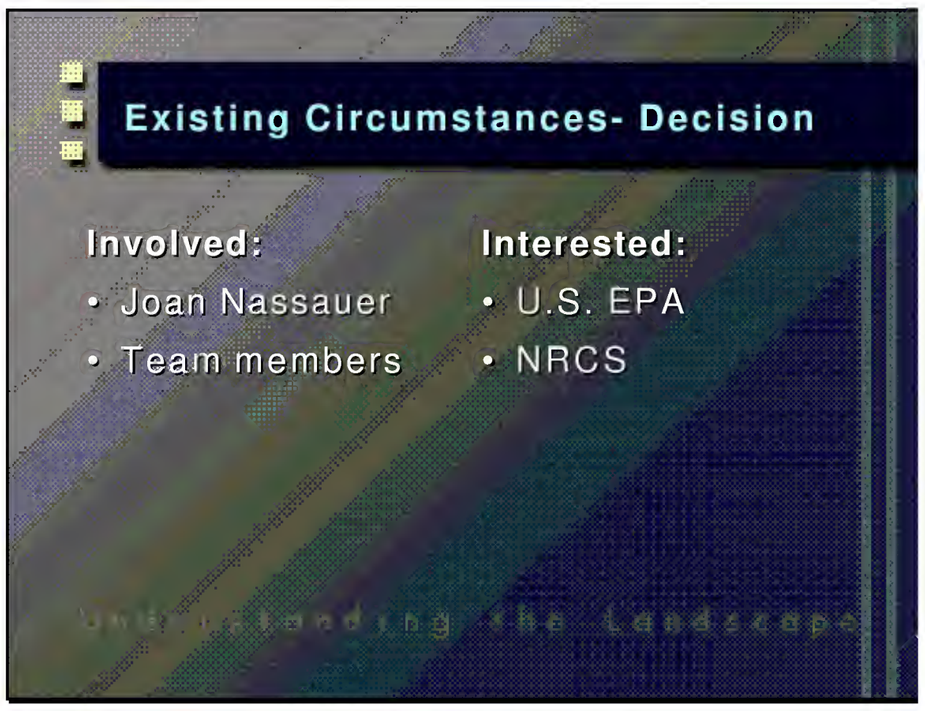

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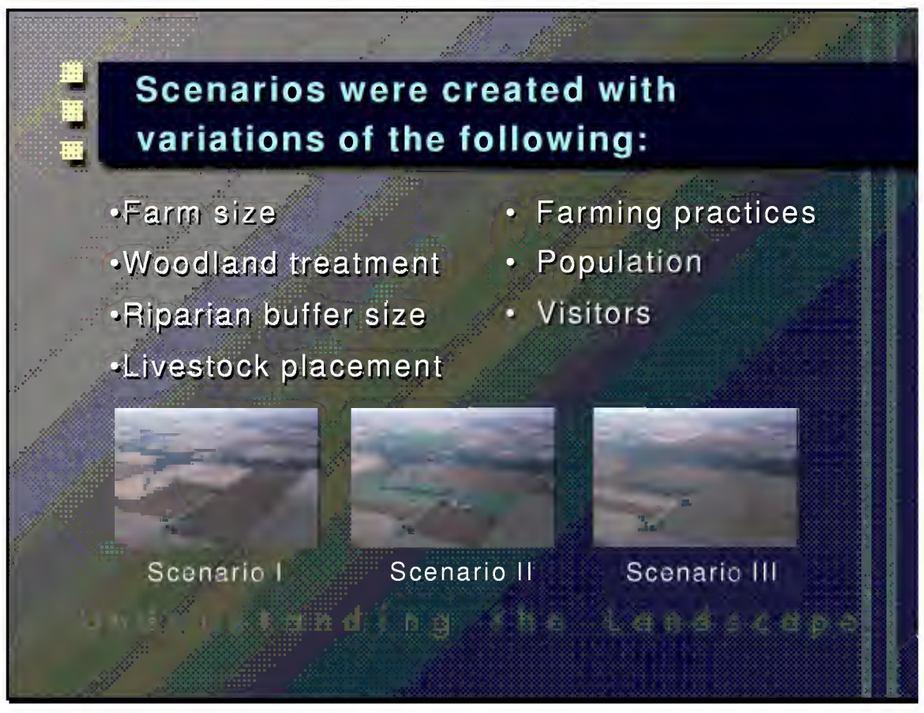

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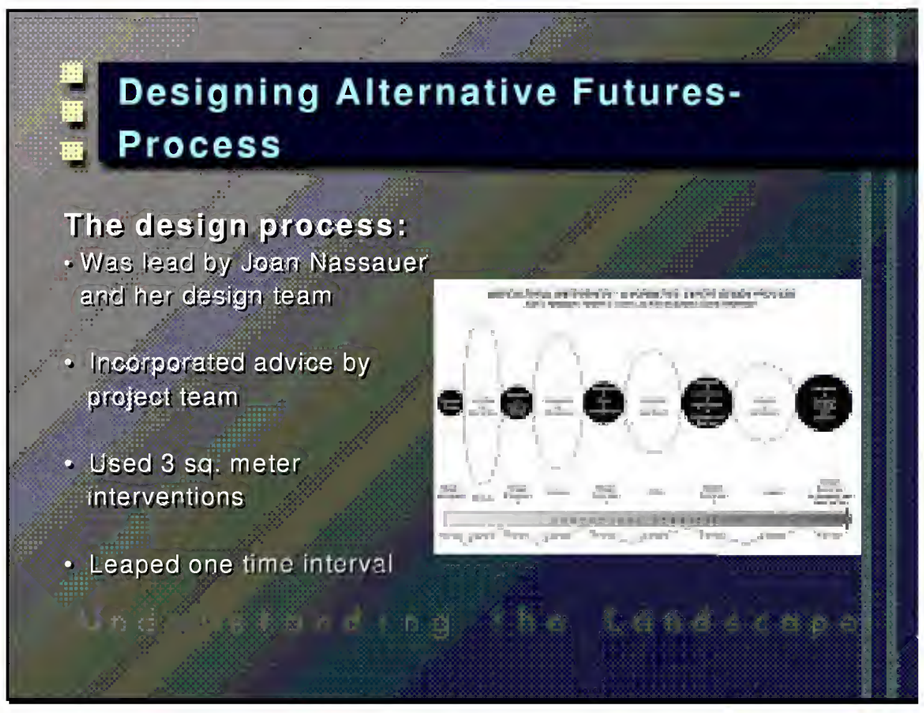

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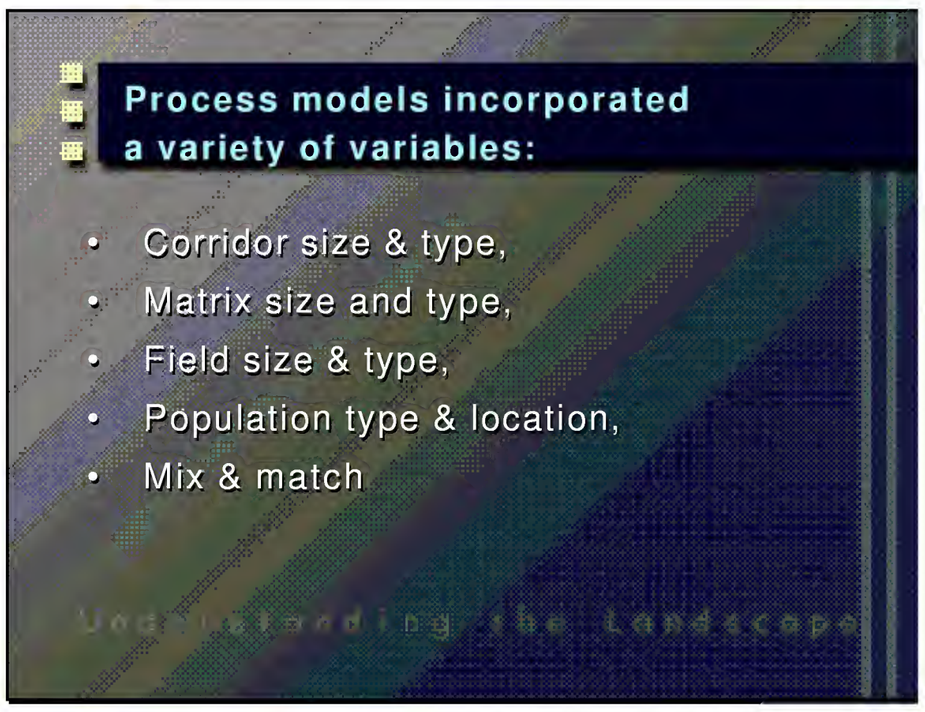

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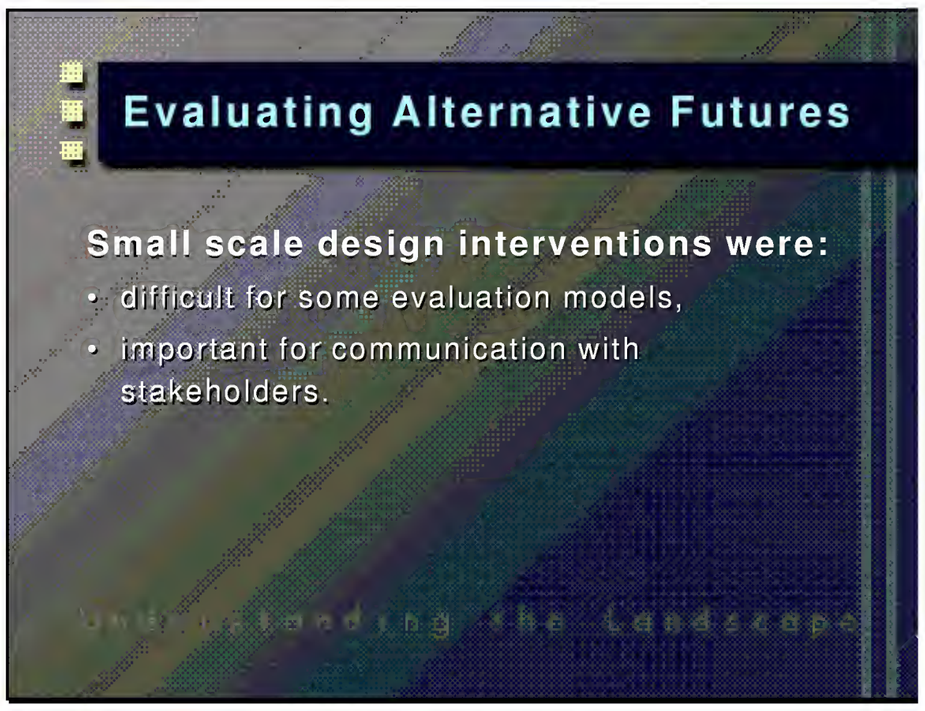

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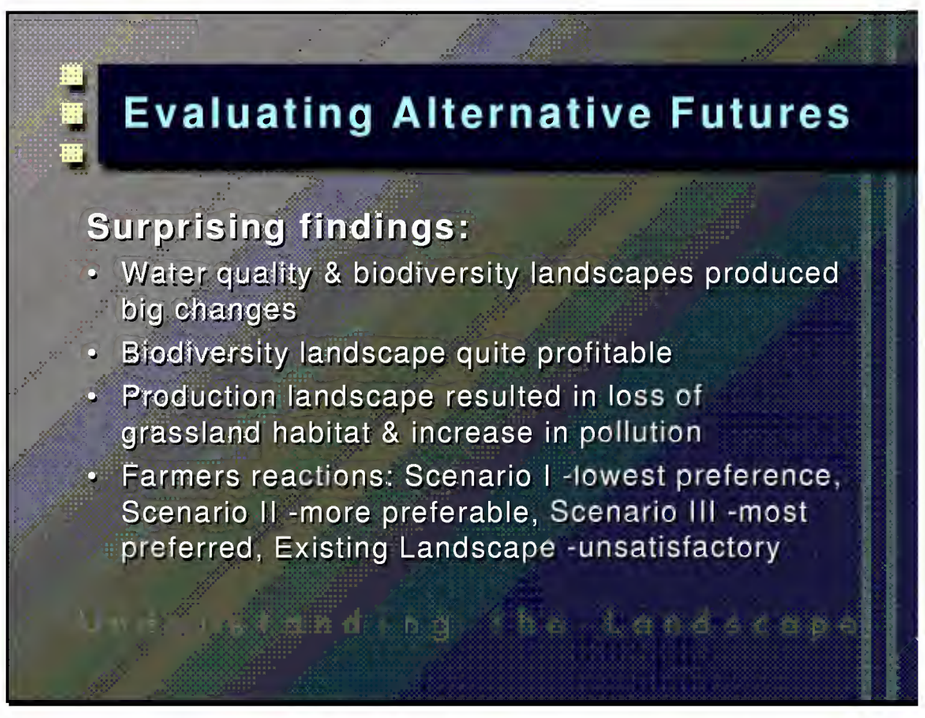

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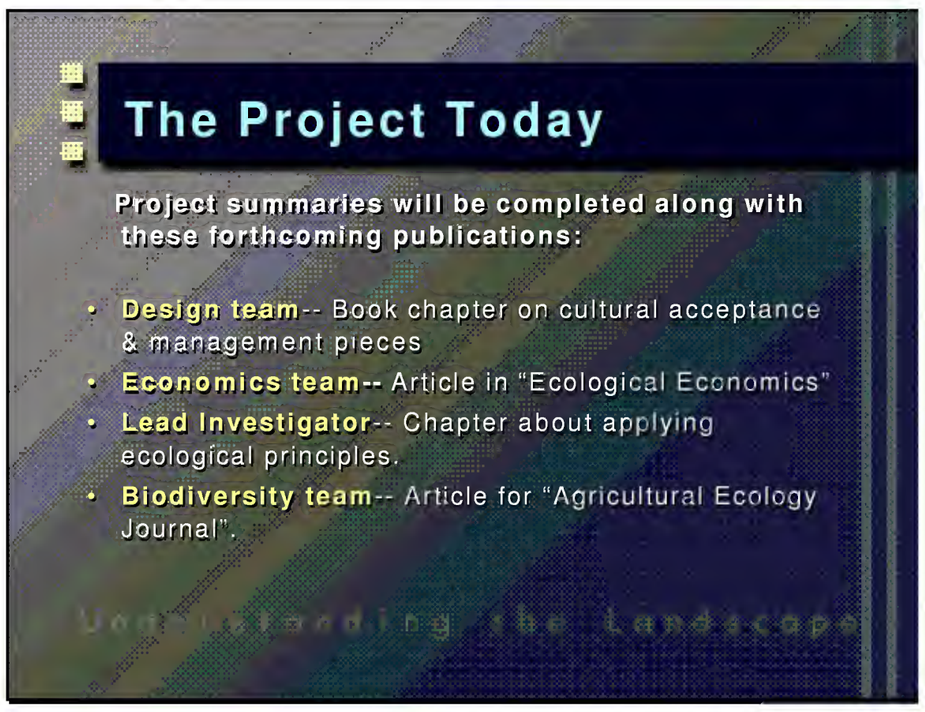

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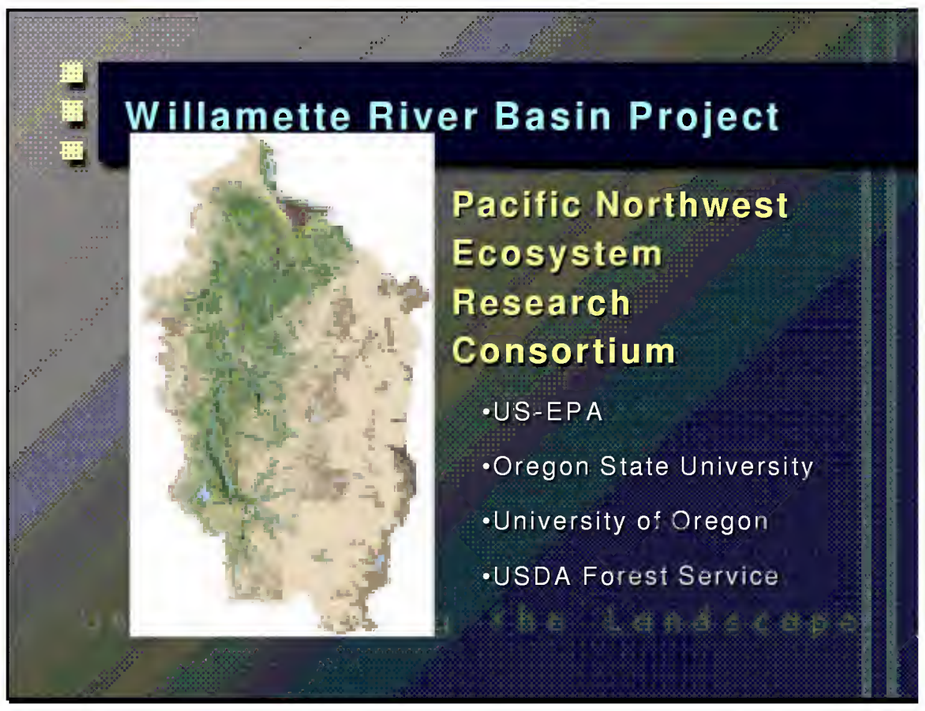

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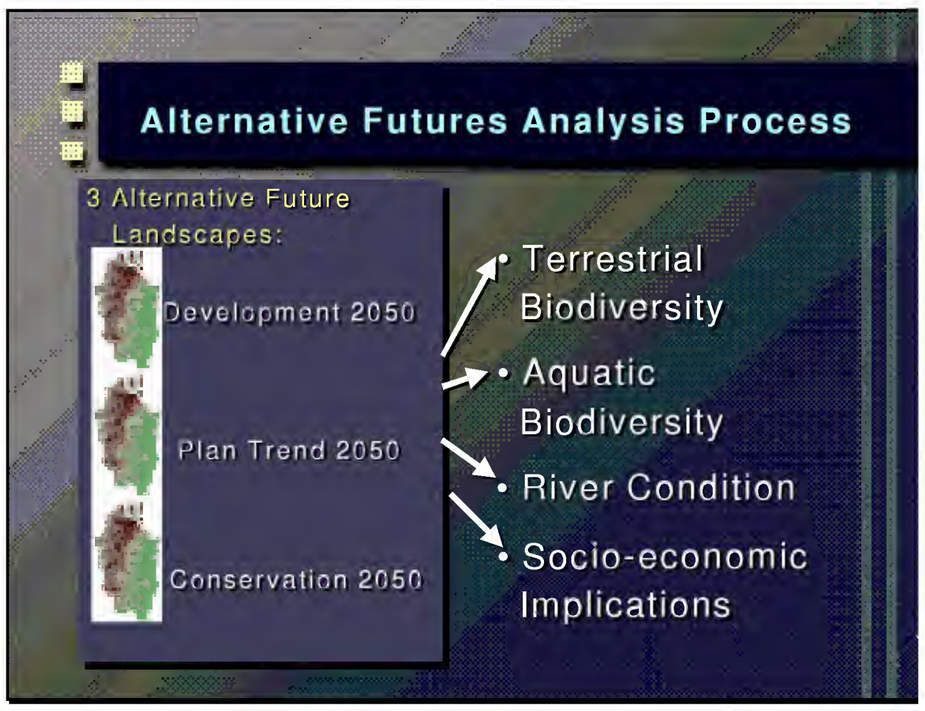

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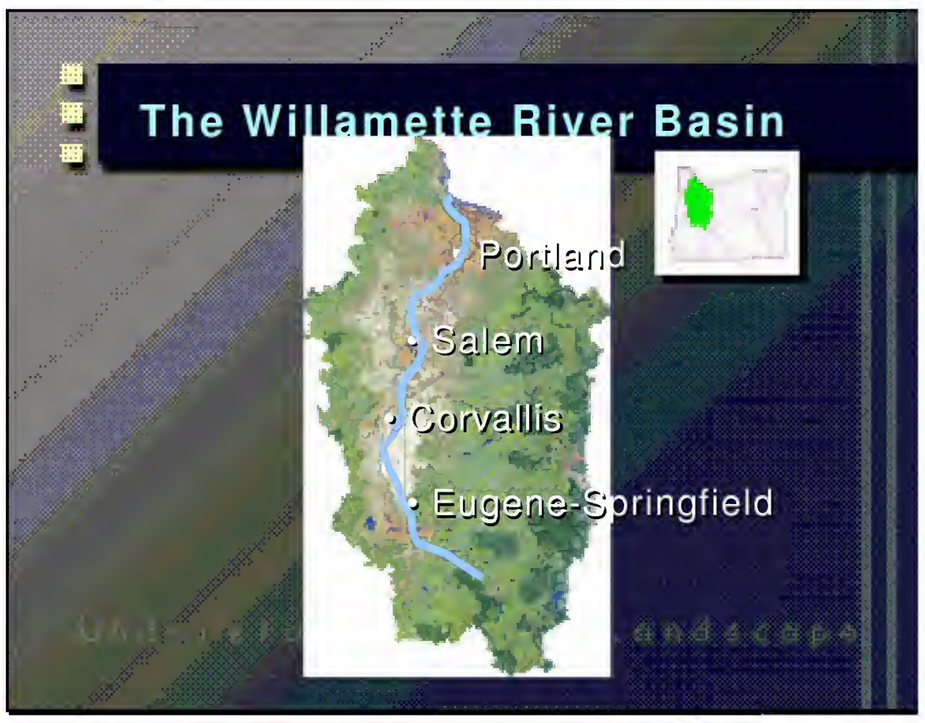

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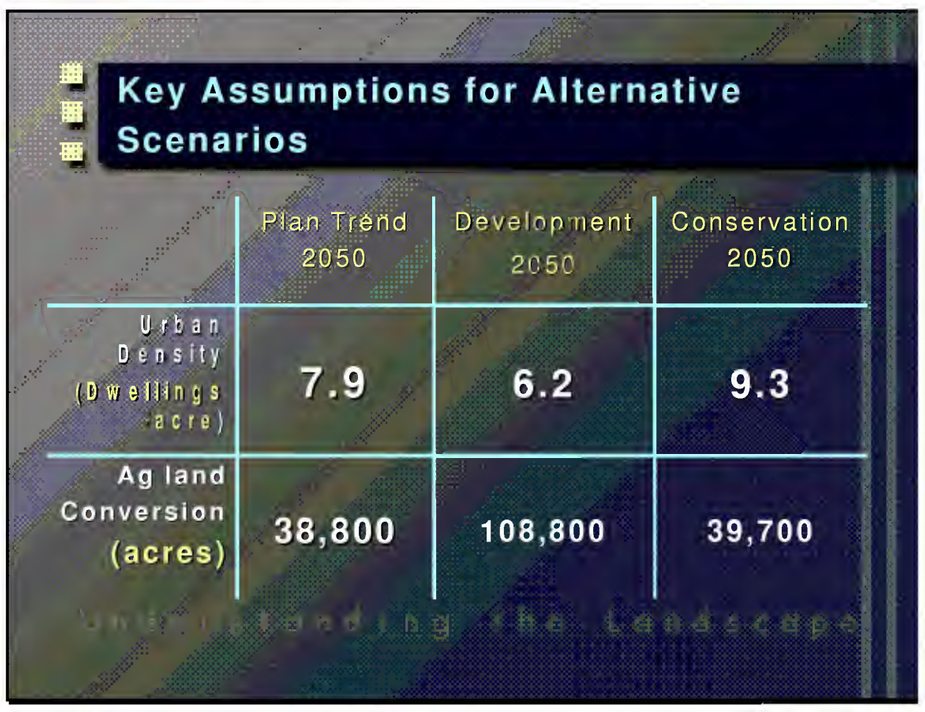

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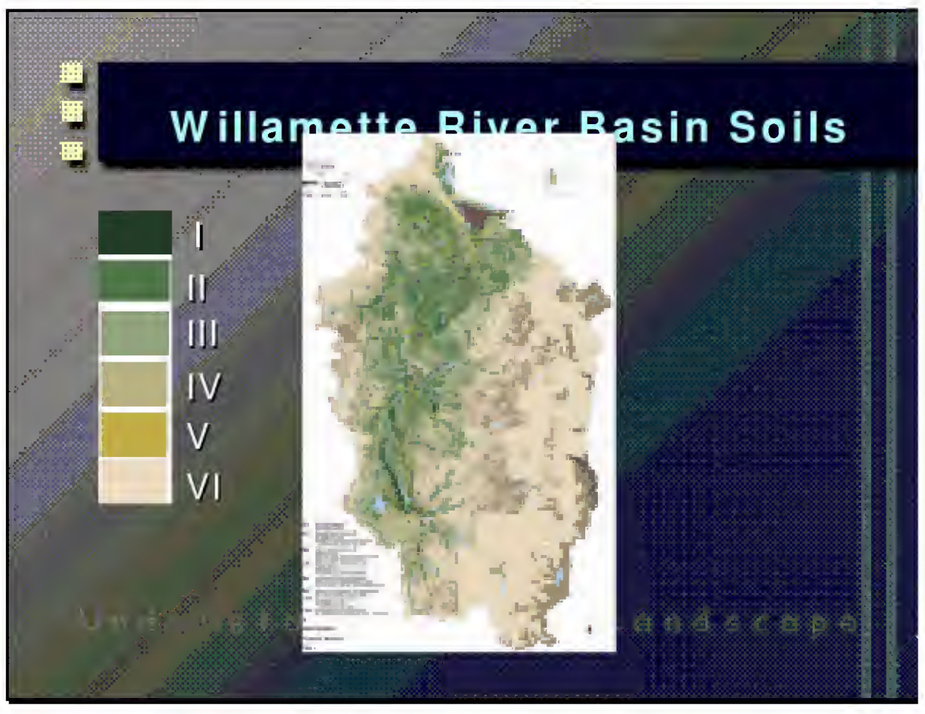

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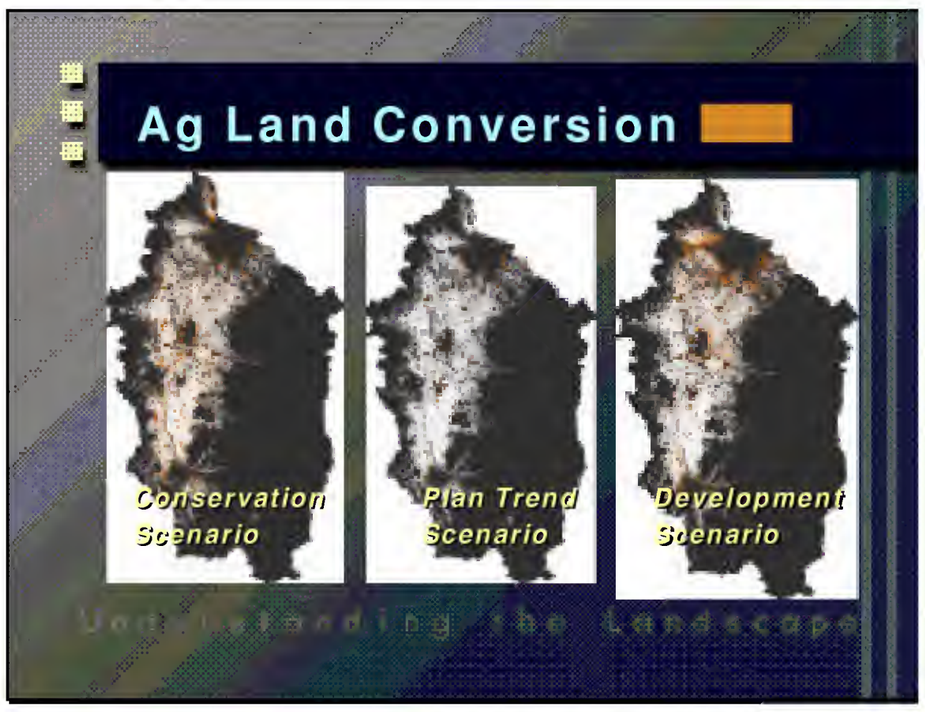

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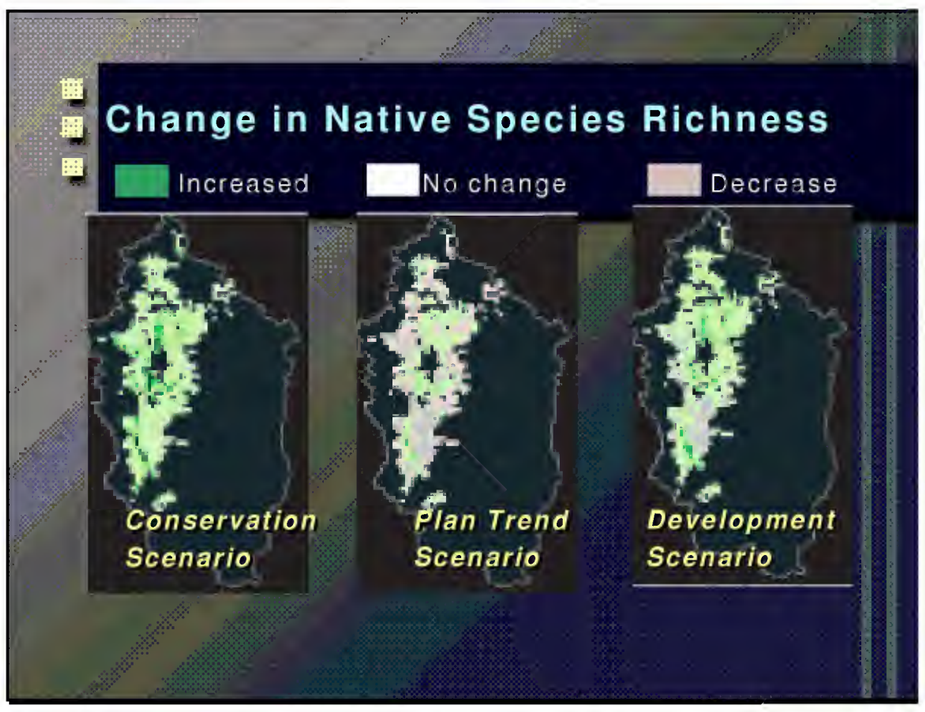

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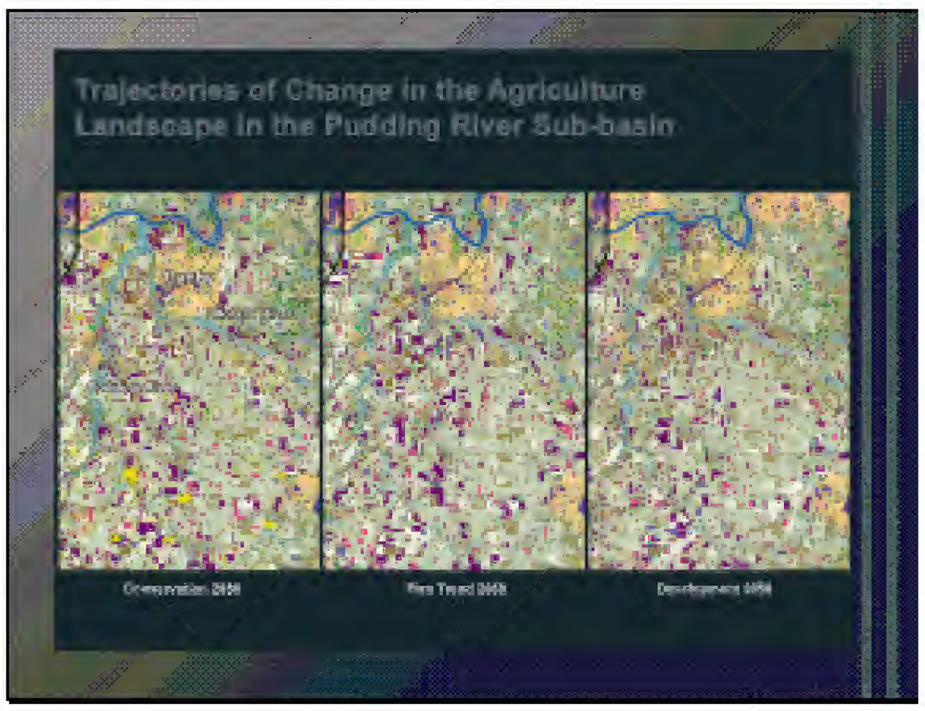

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Kinds of Conservation Lands

Tier 1 Lands

- Managed with priority given to conserving, creating and maintaining a naturally functioning landscape

Tier 2 Lands (Working Landscape)

- Managed for production, but with increased importance placed on habitat protection.

Understanding the Landscape

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Targets for Sustaining Habitat

Habitat Type	Conservation 2050 (acres)	Target Tier 1 (acres)	Target Tier 2 (acres)
Bottomland Forest	147,000	58-65,000	82 - 89,000
Oak Savanna	70,000	70,000	1,701,000
Prairie	70-75,000	70-75,000	876,900
Emergent Wetlands	3,000	3,000	4,700

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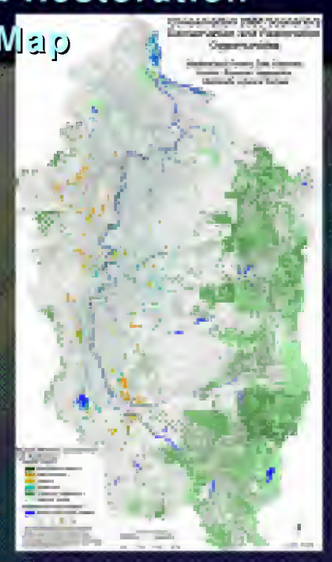
Conservation & Restoration Opportunities Map



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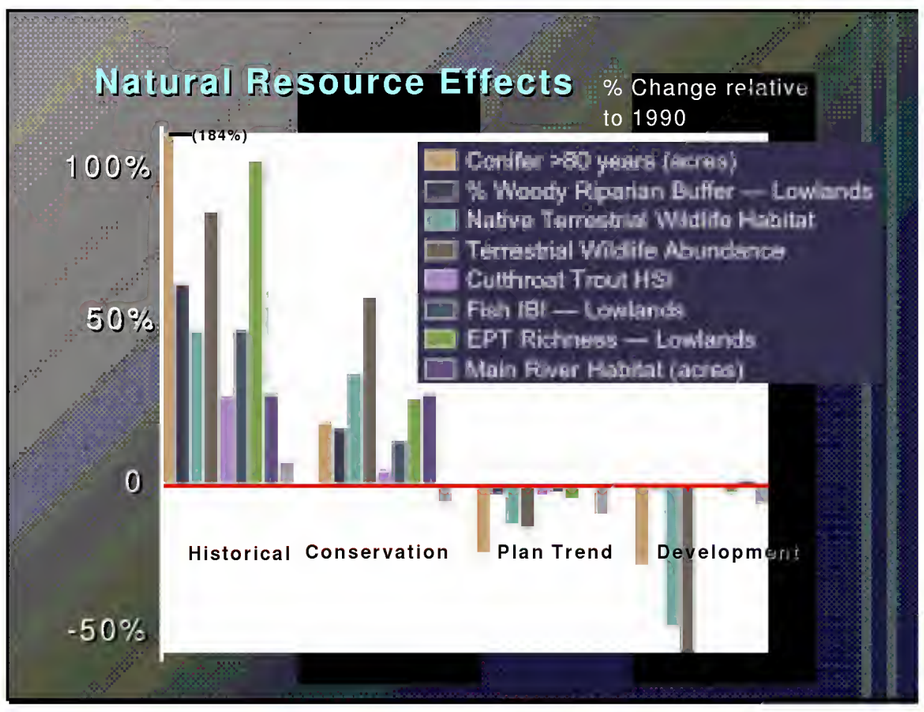

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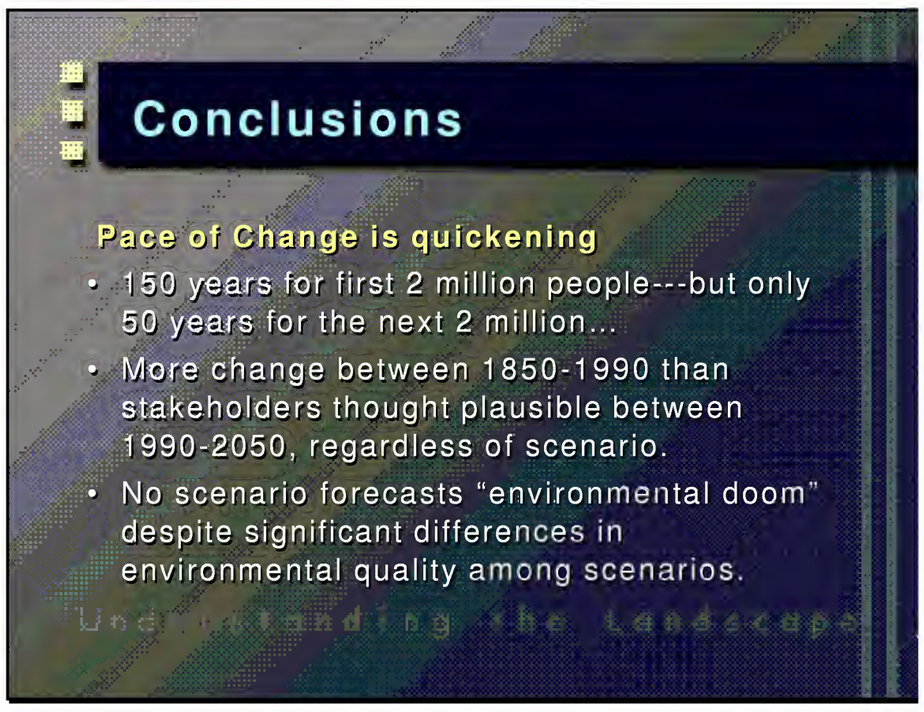

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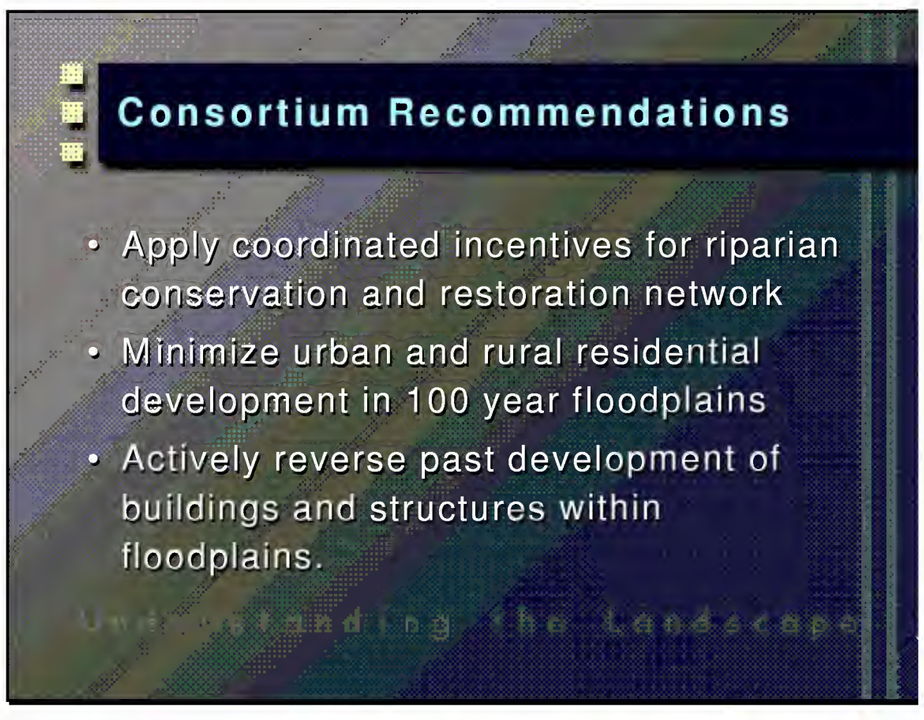

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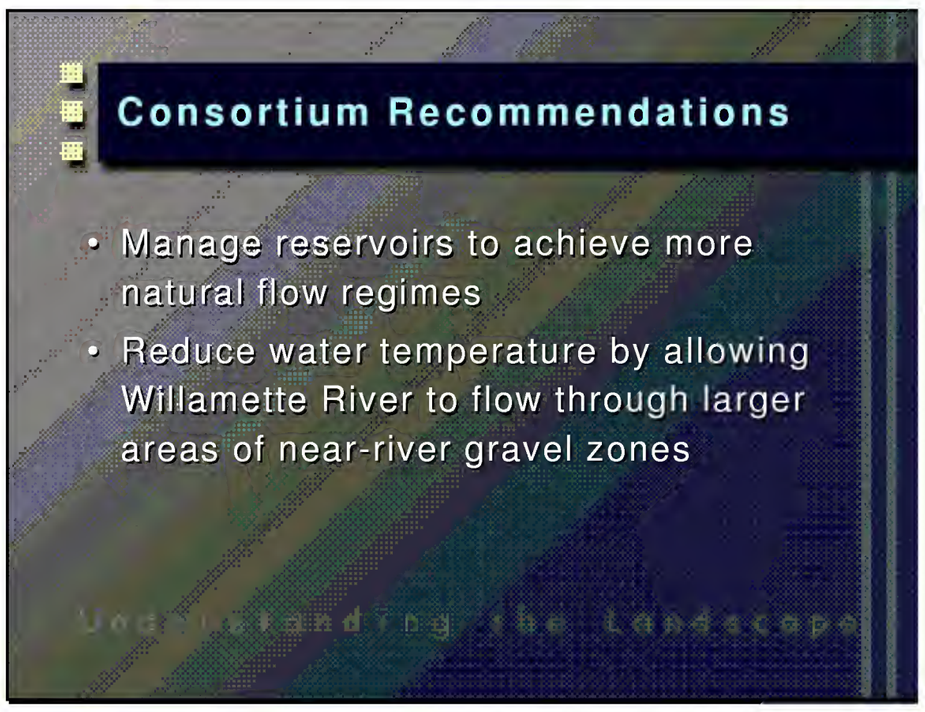

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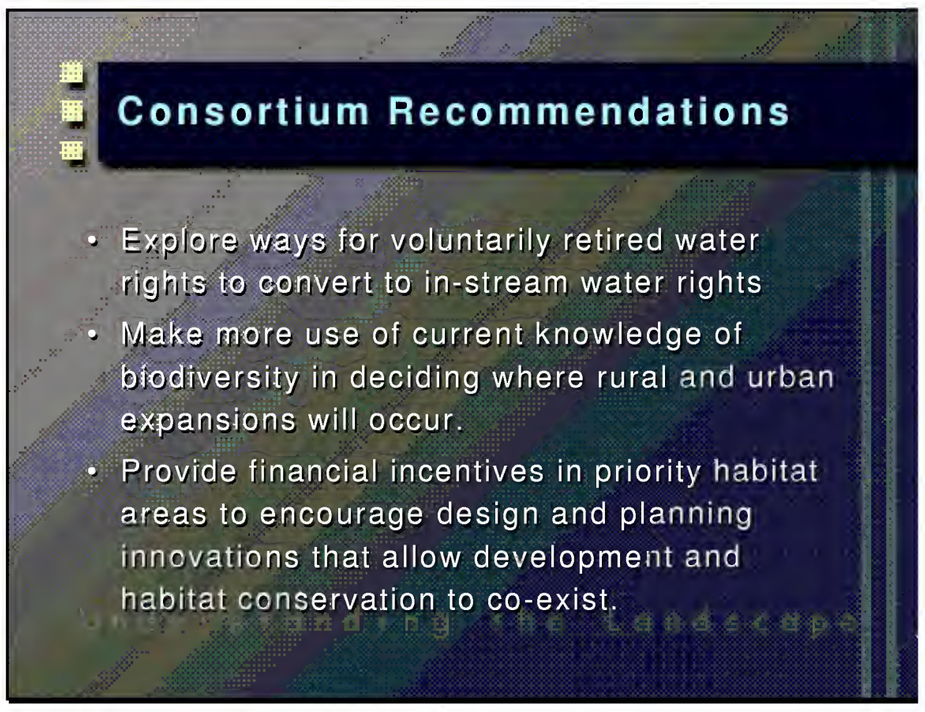

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